Listing of Claims:

1. (Original) An angle demodulation apparatus comprising:

a first oscillator for generating a first local oscillation signal and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees;

a first mixer for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillator, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed;

a second oscillator for generating a second local oscillation signal and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees;

a second mixer for receiving said first and second base band signals from said first mixer, receiving said second local oscillation signal and said second phase signal from said second

oscillator, and generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal; and

a demodulator for receiving said intermediate frequency signal from said second mixer and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal,

said second oscillator including a reference oscillator for generating a reference oscillation signal, and a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio,

said first oscillator including a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a

frequency having a given ratio to a frequency of said received reference oscillation signal.

2. (Original) The angle demodulation apparatus according to claim 1, wherein said reference oscillator has a frequency control circuit for receiving said intermediate frequency signal and generating said reference oscillation signal whose frequency is said frequency of said second local oscillation signal multiplied by said first frequency dividing ratio by generating a signal whose frequency converges to a frequency having a given ratio to a carrier frequency of said received intermediate frequency signal.

3. (Original) The angle demodulation apparatus according to claim 2, wherein said frequency control circuit has a first PLL (Phase-Locked Loop) control circuit for determining said frequency of said reference oscillation signal, based on a phase difference between a carrier component of said received intermediate frequency signal and a signal acquired by frequency-dividing said reference oscillation signal by a predetermined second frequency dividing ratio, in such a way that said frequency of said reference oscillation signal converges to a value having a given ratio to a frequency of said carrier

component, and generating said reference oscillation signal having said determined frequency.

4. (Original) The angle demodulation apparatus according to claim 3, wherein said variable frequency oscillator has a second PLL (Phase-Locked Loop) control circuit for determining said frequency of said first local oscillation signal, based on a phase difference between a signal acquired by frequency-dividing said received reference oscillation signal by a predetermined third frequency dividing ratio and a signal acquired by frequency-dividing said first local oscillation signal by a predetermined fourth frequency dividing ratio, in such a way that said frequency of said first local oscillation signal converges to a value having a given ratio to said frequency of said reference oscillation signal, and generating said first local oscillation signal having said determined frequency.

5. (Original) The angle demodulation apparatus according to claim 4, wherein said offset frequency lies within a range of 300 Hz.

6. (Original) The angle demodulation apparatus according to claim 4, wherein said first oscillator has means for changing said ratio of said value to which said frequency of said first

local oscillation signal converges to said frequency of said reference oscillation signal in accordance with manipulation by an operator.

7. (Original) The angle demodulation apparatus according to claim 1, wherein said variable frequency oscillator has a PLL (Phase-Locked Loop) control circuit for determining said frequency of said first local oscillation signal, based on a phase difference between a signal acquired by frequency-dividing said received reference oscillation signal by said predetermined first frequency dividing ratio and a signal acquired by frequency-dividing said first local oscillation signal by a predetermined second frequency dividing ratio, in such a way that said frequency of said first local oscillation signal converges to a value having a given ratio to said frequency of said reference oscillation signal, and generating said first local oscillation signal having said determined frequency.

Claims 8-13 (Canceled).

14. (Original) A local oscillation apparatus for supplying a frequency converting apparatus for generating a base band signal based on a first local oscillation signal and an angle modulation signal and generating an intermediate frequency signal

based on a second local oscillation signal and said base band signal, with said first and second local oscillation signals, said local oscillation apparatus comprising:

a reference oscillator for generating a reference oscillation signal;

a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

15. (Original) The local oscillation apparatus according to claim 14, wherein said reference oscillator has a frequency control circuit for receiving said intermediate frequency signal and generating said reference oscillation signal whose frequency is said frequency of said second local oscillation signal

multiplied by said first frequency dividing ratio by generating a signal whose frequency converges to a frequency having a given ratio to a carrier frequency of said received intermediate frequency signal.

16. (Original) The local oscillation apparatus according to claim 15, wherein said frequency control circuit has a first PLL (Phase-Locked Loop) control circuit for determining said frequency of said reference oscillation signal, based on a phase difference between a carrier component of said received intermediate frequency signal and a signal acquired by frequency-dividing said reference oscillation signal by a predetermined second frequency dividing ratio, in such a way that said frequency of said reference oscillation signal converges to a value having a given ratio to a frequency of said carrier component, and generating said reference oscillation signal having said determined frequency.

17. (Original) The local oscillation apparatus according to claim 16, wherein said variable frequency oscillator has a second PLL (Phase-Locked Loop) control circuit for determining said frequency of said first local oscillation signal, based on a phase difference between a signal acquired by frequency-dividing said received reference oscillation signal by a predetermined

third frequency dividing ratio and a signal acquired by frequency-dividing said first local oscillation signal by a predetermined fourth frequency dividing ratio, in such a way that said frequency of said first local oscillation signal converges to a value having a given ratio to said frequency of said reference oscillation signal, and generating said first local oscillation signal having said determined frequency.

18. (Original) The local oscillation apparatus according to claim 17, wherein said offset frequency lies within a range of 300 Hz.

19. (Original) The local oscillation apparatus according to claim 17, wherein said first oscillator has means for changing said ratio of said value to which said frequency of said first local oscillation signal converges to said frequency of said reference oscillation signal in accordance with manipulation by an operator.

20. (Original) The local oscillation apparatus according to claim 14, wherein said variable frequency oscillator has a PLL (Phase-Locked Loop) control circuit for determining said frequency of said first local oscillation signal, based on a phase difference between a signal acquired by frequency-dividing

said received reference oscillation signal by said predetermined first frequency dividing ratio and a signal acquired by frequency-dividing said first local oscillation signal by a predetermined second frequency dividing ratio, in such a way that said frequency of said first local oscillation signal converges to a value having a given ratio to said frequency of said reference oscillation signal, and generating said first local oscillation signal having said determined frequency.

21. (Original) An angle demodulation method comprising the steps of:

generating a first local oscillation signal and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees;

externally receiving an angle modulation signal, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed;

generating a second local oscillation signal and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees;

generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal; and

generating an angle demodulation signal by detecting said intermediate frequency signal,

whereby said second local oscillation signal has a frequency substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range and is generated by frequency-dividing a reference oscillation signal by a predetermined first frequency dividing ratio, and

said first local oscillation signal has a frequency substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency and is generated by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

Claim 22 (Canceled).

23. (Original) A local oscillation signal generating method of supplying a frequency converting apparatus for generating a base band signal based on a first local oscillation signal and an angle modulation signal and generating an intermediate frequency signal based on a second local oscillation signal and said base band signal, with said first and second local oscillation signals, said method comprising the steps of:

generating a reference oscillation signal;

generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

24. (Original) A computer readable recording medium having recorded a program for allowing a computer to function as:

a first oscillator for generating a first local oscillation signal and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees,

a first mixer for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillator, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed,

a second oscillator for generating a second local oscillation signal and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees,

a second mixer for receiving said first and second base band signals from said first mixer, receiving said second local oscillation signal and said second phase signal from said second oscillator, and generating an intermediate frequency signal

representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal, and

a demodulator for receiving said intermediate frequency signal from said second mixer and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal;

for allowing said second oscillator to function as a reference oscillator for generating a reference oscillation signal, and a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

for allowing said first oscillator to function as a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency

converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

Claim 25 (Canceled).

26. (Original) A computer readable recording medium having recorded a program for allowing a computer to function as a local oscillation apparatus for supplying a frequency converting apparatus for generating a base band signal based on a first local oscillation signal and an angle modulation signal and generating an intermediate frequency signal based on a second local oscillation signal and said base band signal, with said first and second local oscillation signals, and allowing said local oscillation apparatus to function as:

a reference oscillator for generating a reference oscillation signal;

a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation

signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

27. (Original) A computer data signal, carried on a carrier wave, for allowing a computer to function as:

a first oscillator for generating a first local oscillation signal and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees,

a first mixer for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillator, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed,

a second oscillator for generating a second local oscillation signal and a second phase signal whose phase differs

from that of said second local oscillation signal substantially by 90 degrees,

a second mixer for receiving said first and second base band signals from said first mixer, receiving said second local oscillation signal and said second phase signal from said second oscillator, and generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal, and

a demodulator for receiving said intermediate frequency signal from said second mixer and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal;

for allowing said second oscillator to function as a reference oscillator for generating a reference oscillation signal, and a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

for allowing said first oscillator to function as a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

Claim 28 (Canceled).

29. (Original) A computer data signal, carried on a carrier wave, for allowing a computer to function as a local oscillation apparatus for supplying a frequency converting apparatus for generating a base band signal based on a first local oscillation signal and an angle modulation signal and generating an intermediate frequency signal based on a second local oscillation signal and said base band signal, with said first and second local oscillation signals, and allowing said local oscillation apparatus to function as:

a reference oscillator for generating a reference oscillation signal;

a frequency divider for generating said second local oscillation signal whose frequency is substantially equal to a

difference between or a sum of a predetermined intermediate frequency signal and an offset frequency of a predetermined range by frequency-dividing said reference oscillation signal by a predetermined first frequency dividing ratio; and

a variable frequency oscillator for receiving said reference oscillation signal and generating said first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of said angle modulation signal and said offset frequency by generating a signal whose frequency converges to a frequency having a given ratio to a frequency of said received reference oscillation signal.

30. (New) An angle demodulation apparatus comprising:

a first oscillation section for generating, based on a reference oscillation signal, a first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of an angle modulation signal and an offset frequency of a predetermined range and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees;

a first mixing section for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillation section, generating a first base band signal comprised of that of a

product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed;

a second oscillation section for generating, based on said reference oscillation signal, a second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and said offset frequency and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees;

a second mixing section for receiving said first and second base band signals from said first mixing section, receiving said second local oscillation signal and said second phase signal from said second oscillation section, and generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second

base band signal and an instantaneous value of said second phase signal; and

a demodulation section for receiving said intermediate frequency signal from said second mixing section and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal.

31. (New) An angle demodulation method comprising:

generating, based on a reference oscillation signal, a first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of an angle modulation signal and an offset frequency of a predetermined range and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees;

externally receiving an angle modulation signal, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed;

generating, based on said reference oscillation signal, a second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and said offset frequency and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees;

generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal; and

generating an angle demodulation signal by detecting said intermediate frequency signal.

32. (New) A computer readable recording medium having recorded a program for allowing a computer to function as:

a first oscillation section for generating, based on a reference oscillation signal, a first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of an angle modulation signal and an offset frequency of a predetermined range and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees,

a first mixing section for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillation section, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed,

a second oscillation section for generating, based on said reference oscillation signal, a second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and said offset frequency and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees,

a second mixing section for receiving said first and second base band signals from said first mixing section, receiving said second local oscillation signal and said second phase signal from said second oscillation section, and generating an intermediate frequency signal representing a sum of or a difference between a

product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal, and

a demodulation section for receiving said intermediate frequency signal from said second mixing section and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal.

33. (New) A computer data signal, carried on a carrier wave, for allowing a computer to function as:

a first oscillation section for generating, based on a reference oscillation signal, a first local oscillation signal whose frequency is substantially equal to a sum of or a difference between a carrier frequency of an angle modulation signal and an offset frequency of a predetermined range and a first phase signal whose phase differs from that of said first local oscillation signal substantially by 90 degrees,

a first mixing section for externally receiving an angle modulation signal, receiving said first local oscillation signal and said first phase signal from said first oscillation section, generating a first base band signal comprised of that of a product of an instantaneous value of said angle modulation signal

and an instantaneous value of said first local oscillation signal from which a component with a frequency of substantially 0 is removed, and generating a second base band signal comprised of that of a product of said instantaneous value of said angle modulation signal and an instantaneous value of said first phase signal from which a component with a frequency of substantially 0 is removed,

a second oscillation section for generating, based on said reference oscillation signal, a second local oscillation signal whose frequency is substantially equal to a difference between or a sum of a predetermined intermediate frequency signal and said offset frequency and a second phase signal whose phase differs from that of said second local oscillation signal substantially by 90 degrees,

a second mixing section for receiving said first and second base band signals from said first mixing section, receiving said second local oscillation signal and said second phase signal from said second oscillation section, and generating an intermediate frequency signal representing a sum of or a difference between a product of an instantaneous value of said first base band signal and an instantaneous value of said second local oscillation signal and a product of an instantaneous value of said second base band signal and an instantaneous value of said second phase signal, and

a demodulation section for receiving said intermediate frequency signal from said second mixing section and demodulating said intermediate frequency signal to thereby generate an angle demodulation signal.